

FIG. 1A

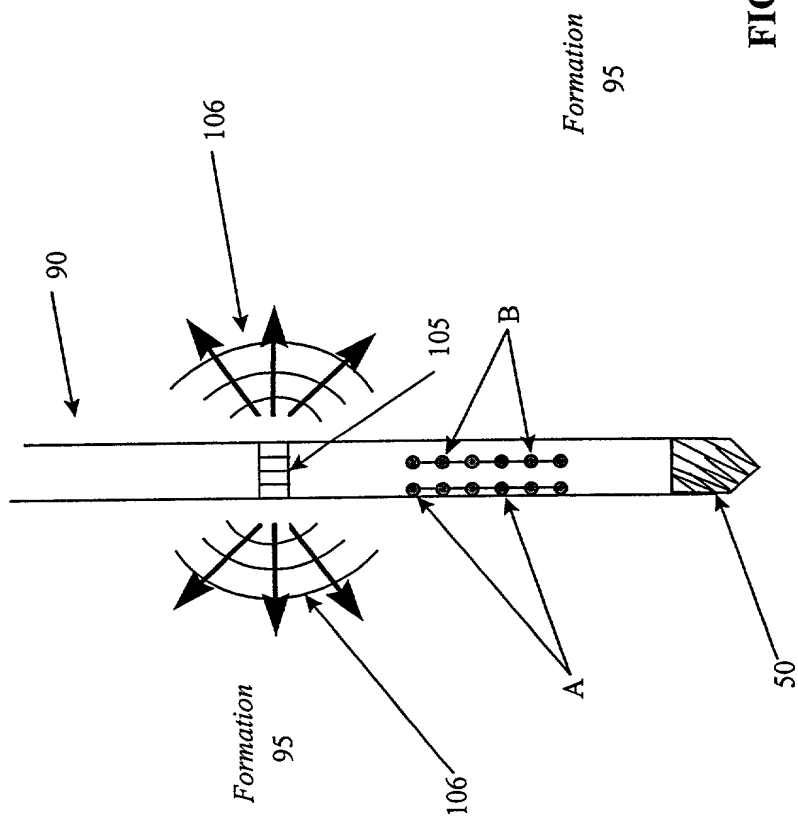


FIGURE 1B

Velocity Dispersion Curves for Formation and Drill-Collar Dipole Modes

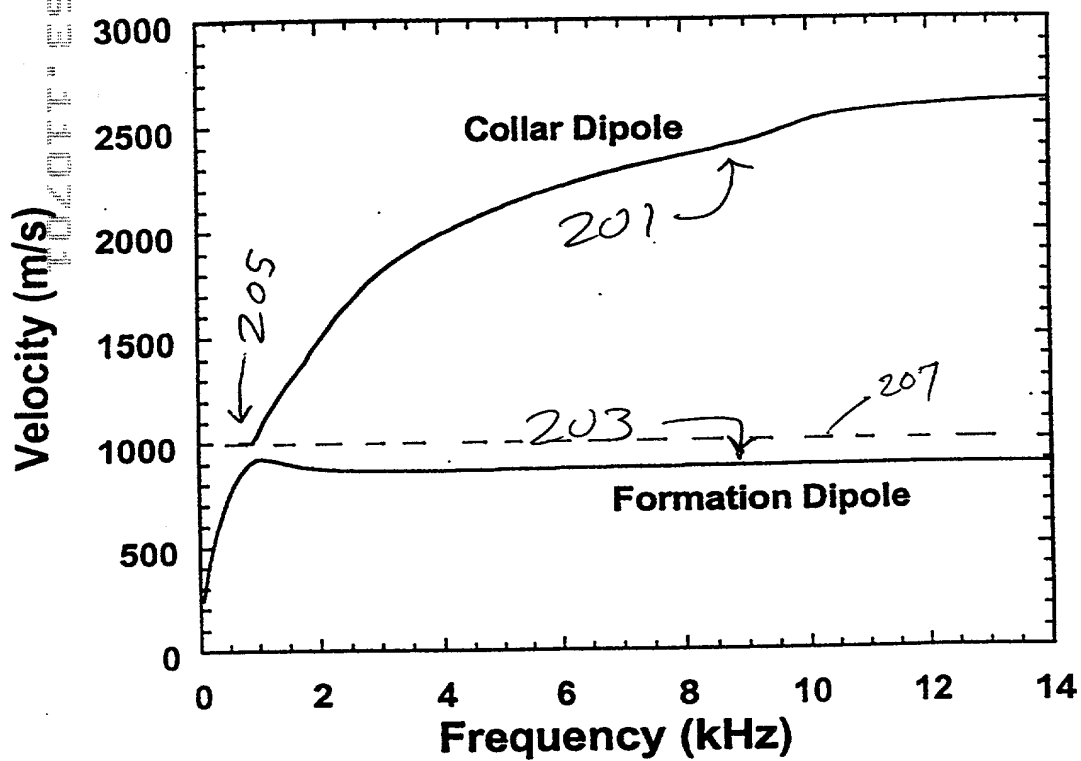


Figure 2

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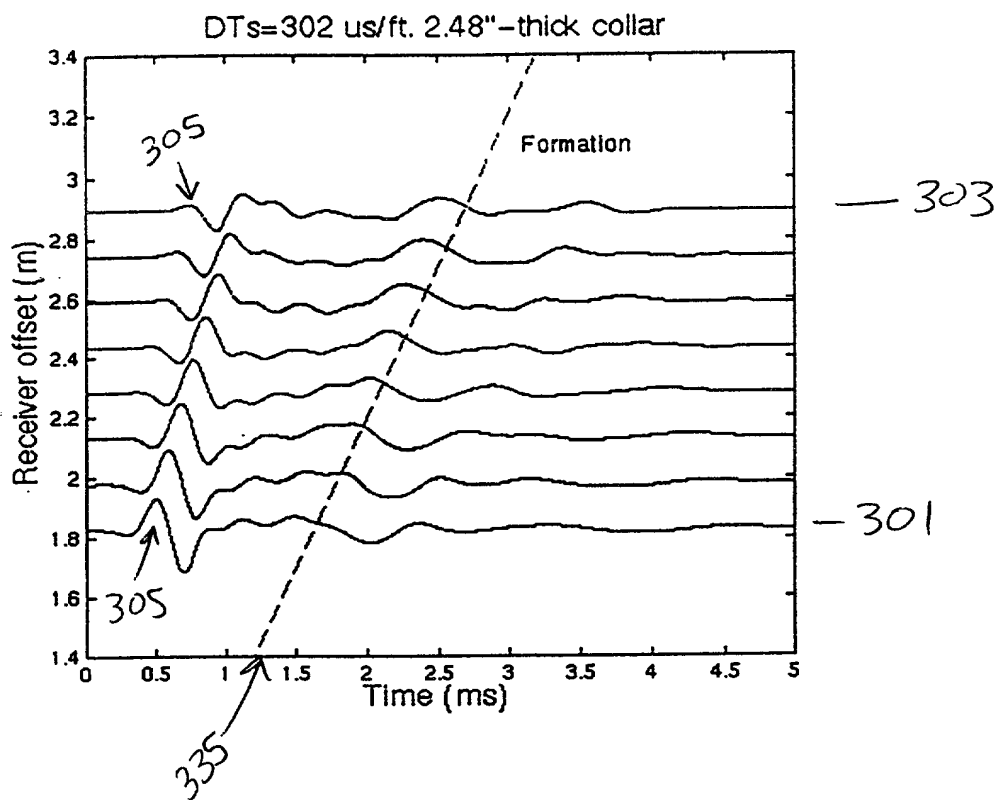


Figure 3
Dipole waveform in the presence of a drilling collar

$\cos 2\theta$ azimuthal distribution of a quadrupole wavefield

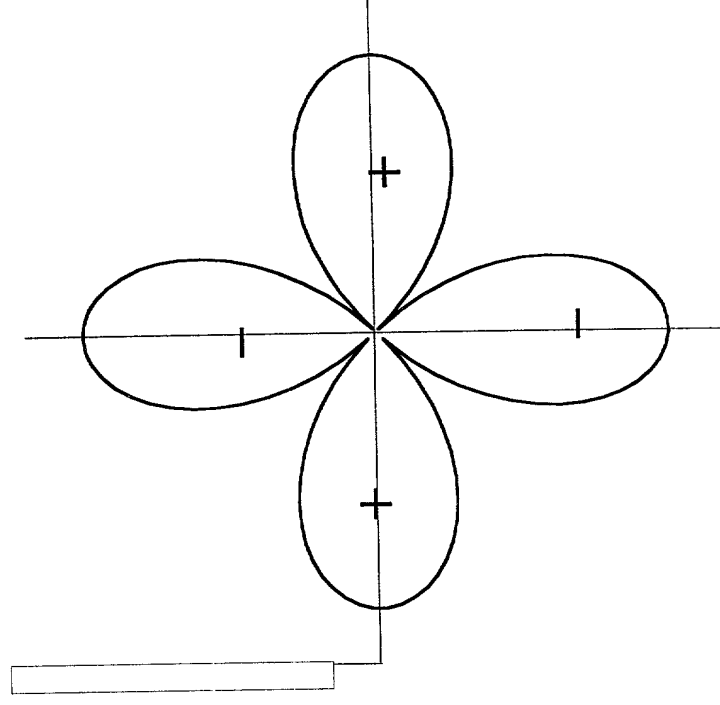


Fig. 49

FOOTNOTES

Velocity Dispersion Curves for Formation and Drill-Collar Quadrapole Modes

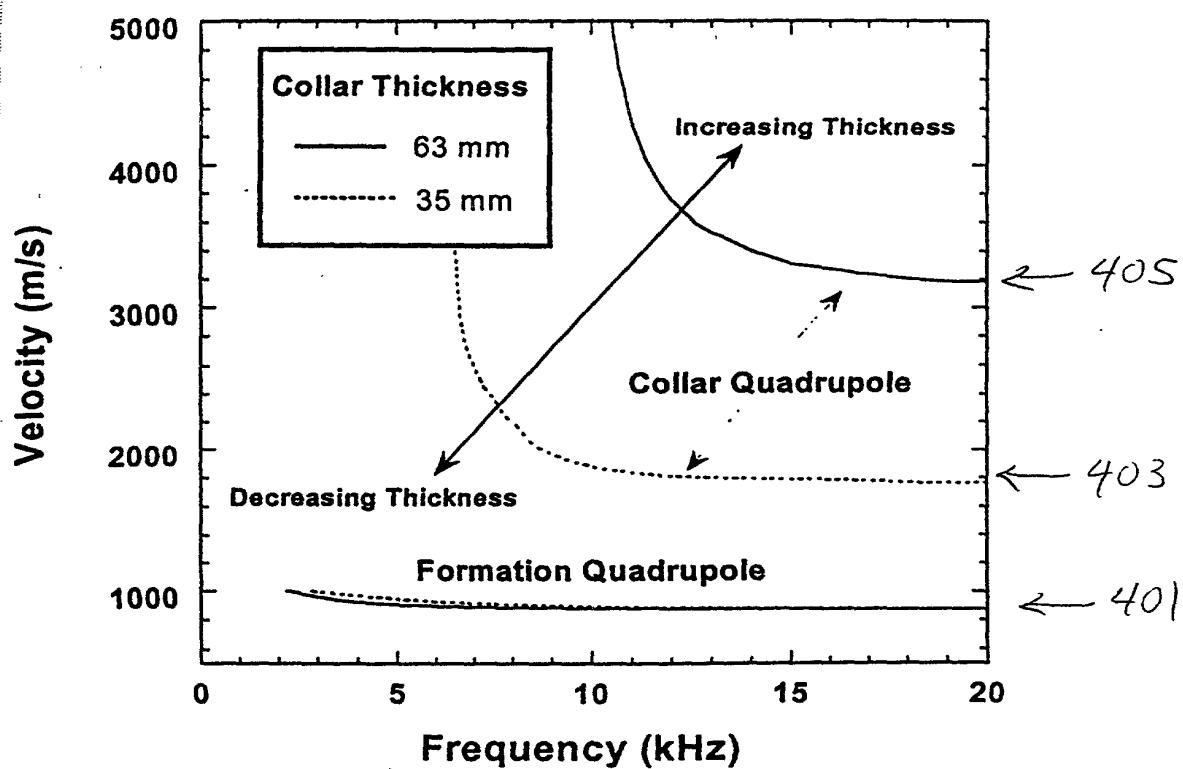


Figure 4 *6*

Figure 5A Wavefield snapshots

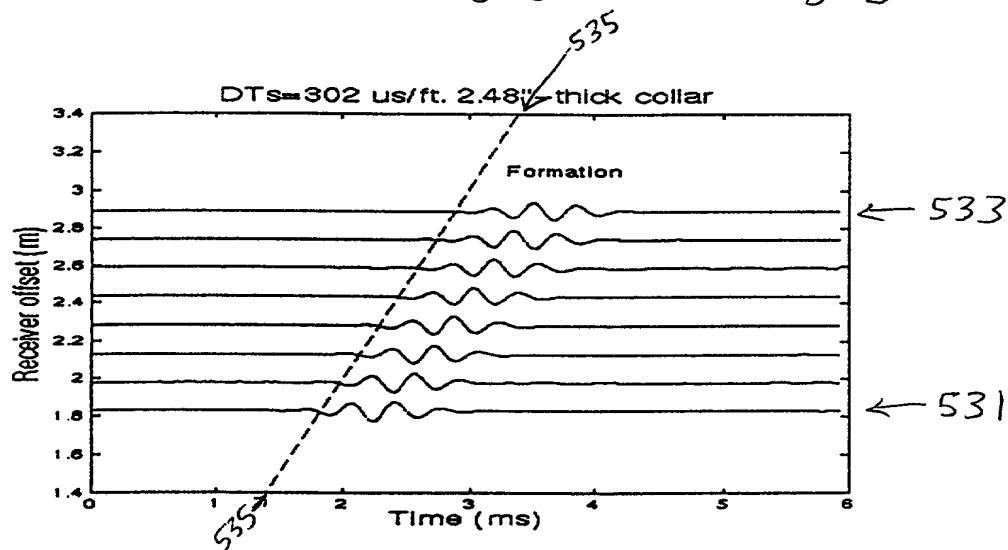
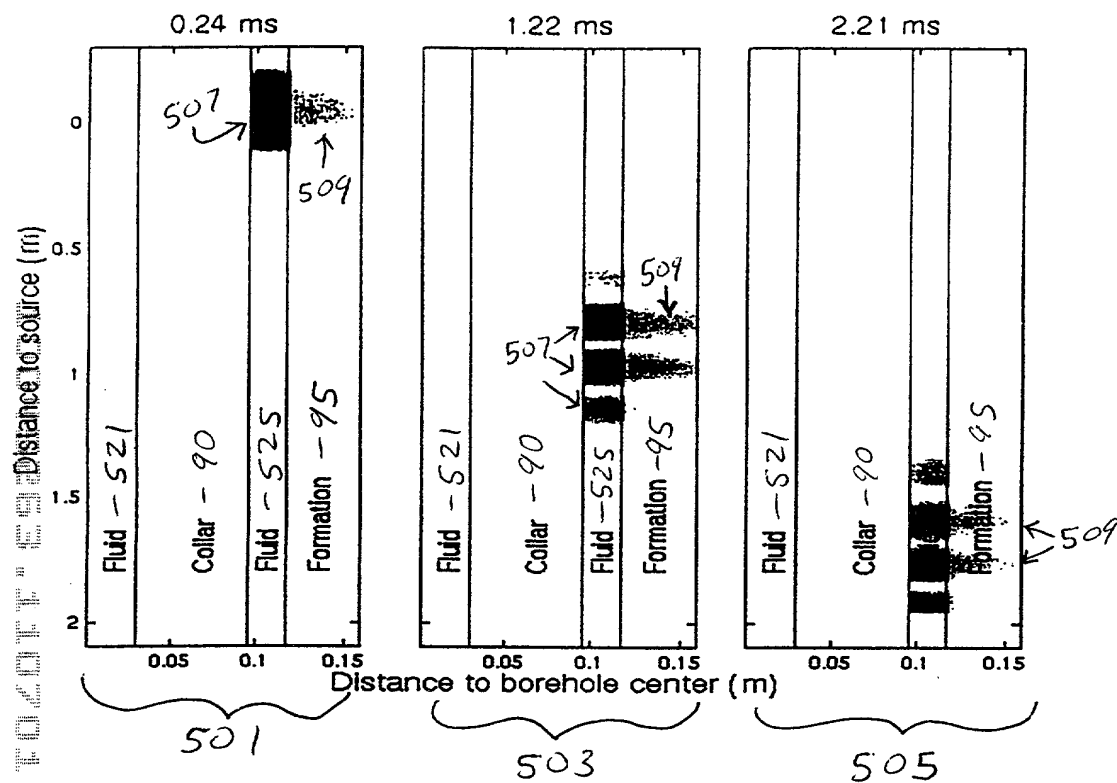


Figure 5B Quadrupole waveforms at various offsets

Figure 6A Wavefield snapshots, thin collar pipe

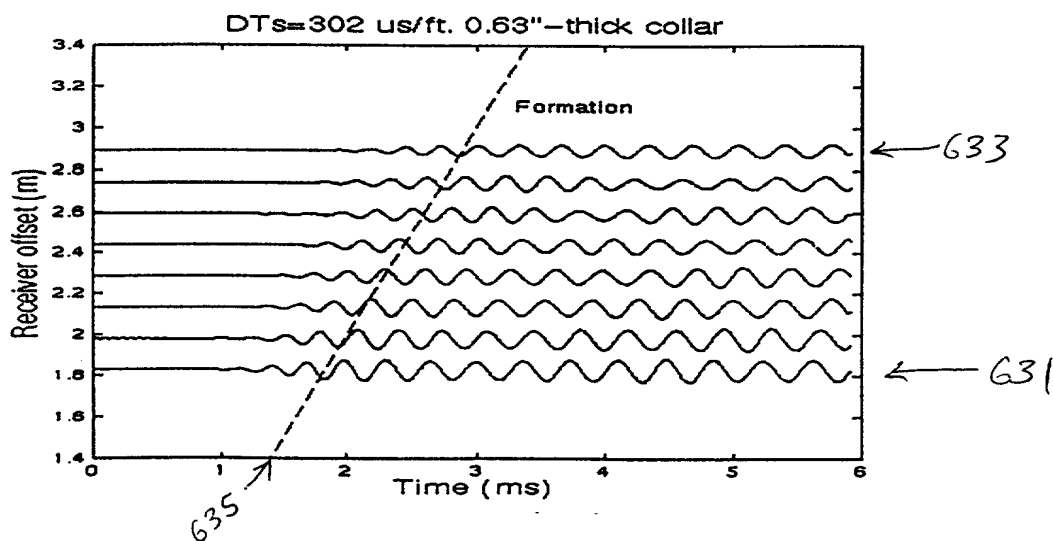
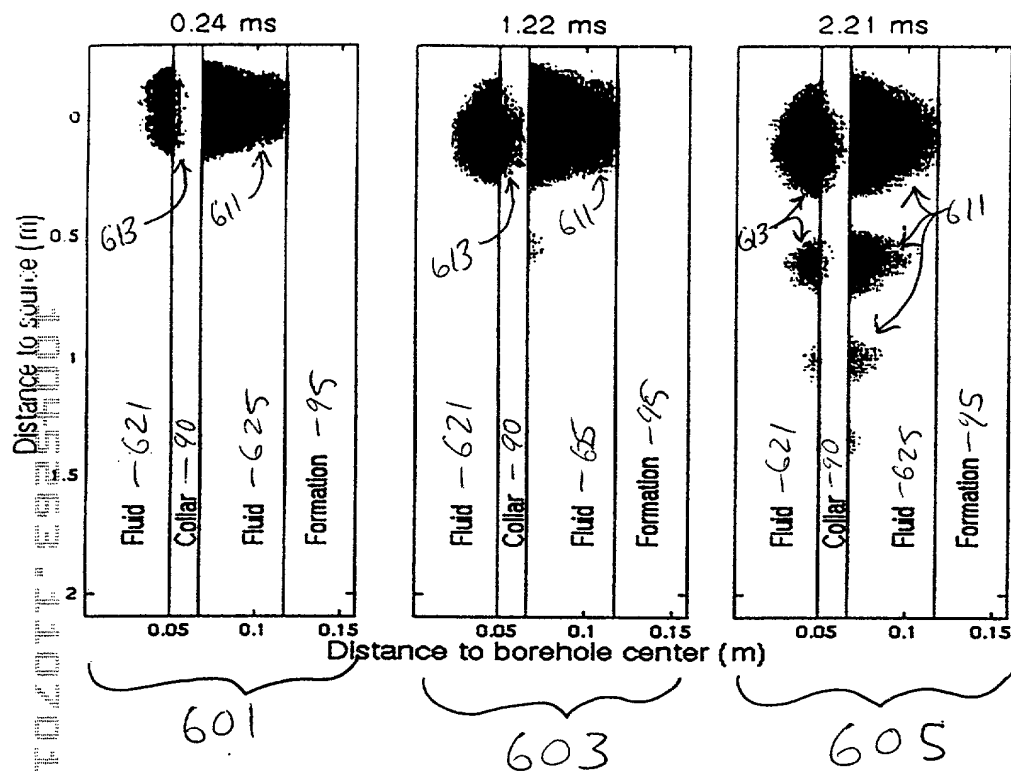


Figure 6B Quadrupole waveforms, thin collar pipe

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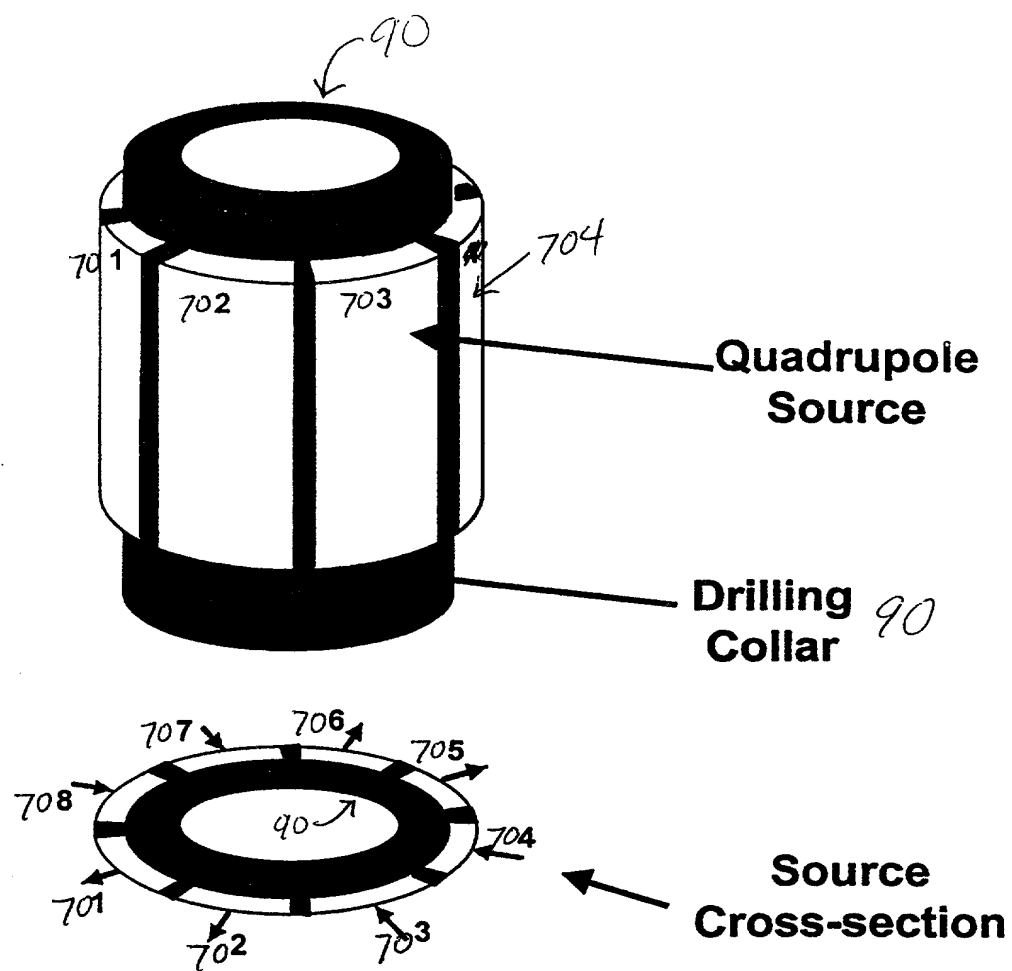


Figure 7

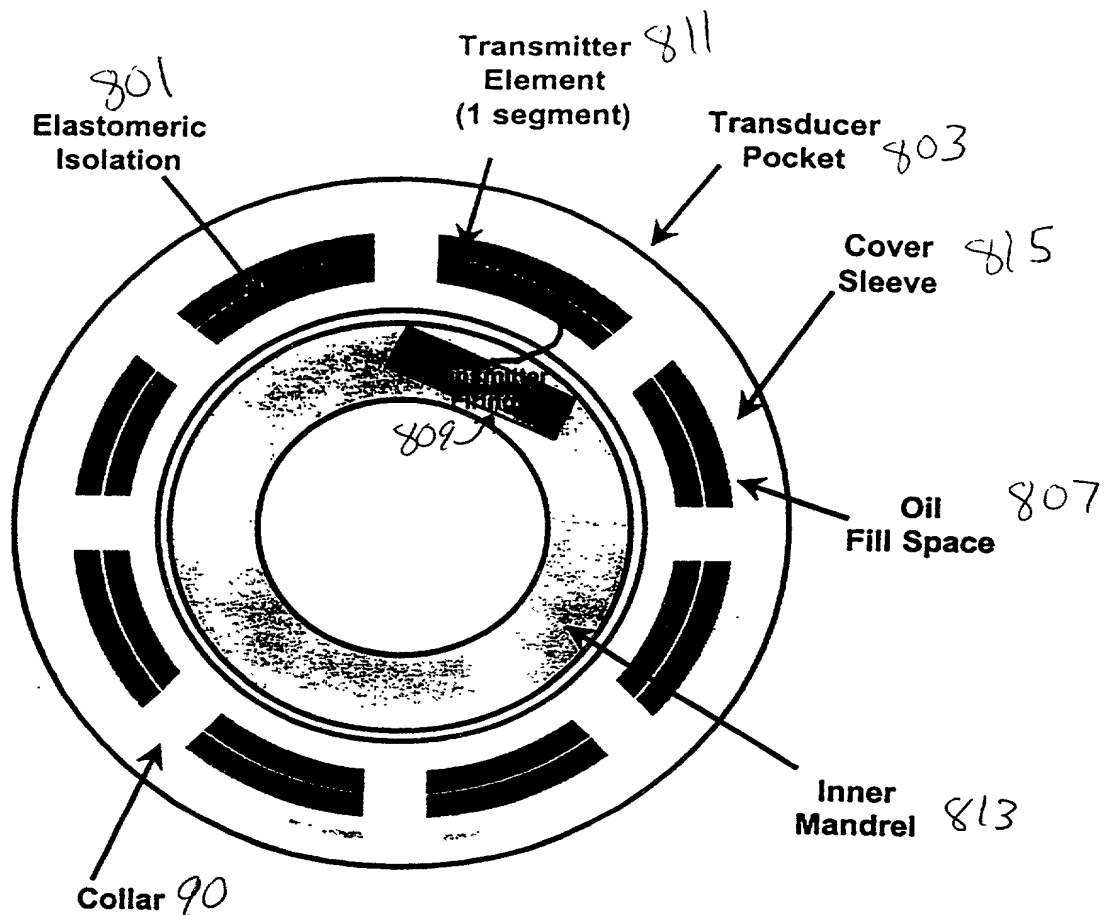


Figure 8 Segmented Ring Transmitter Example

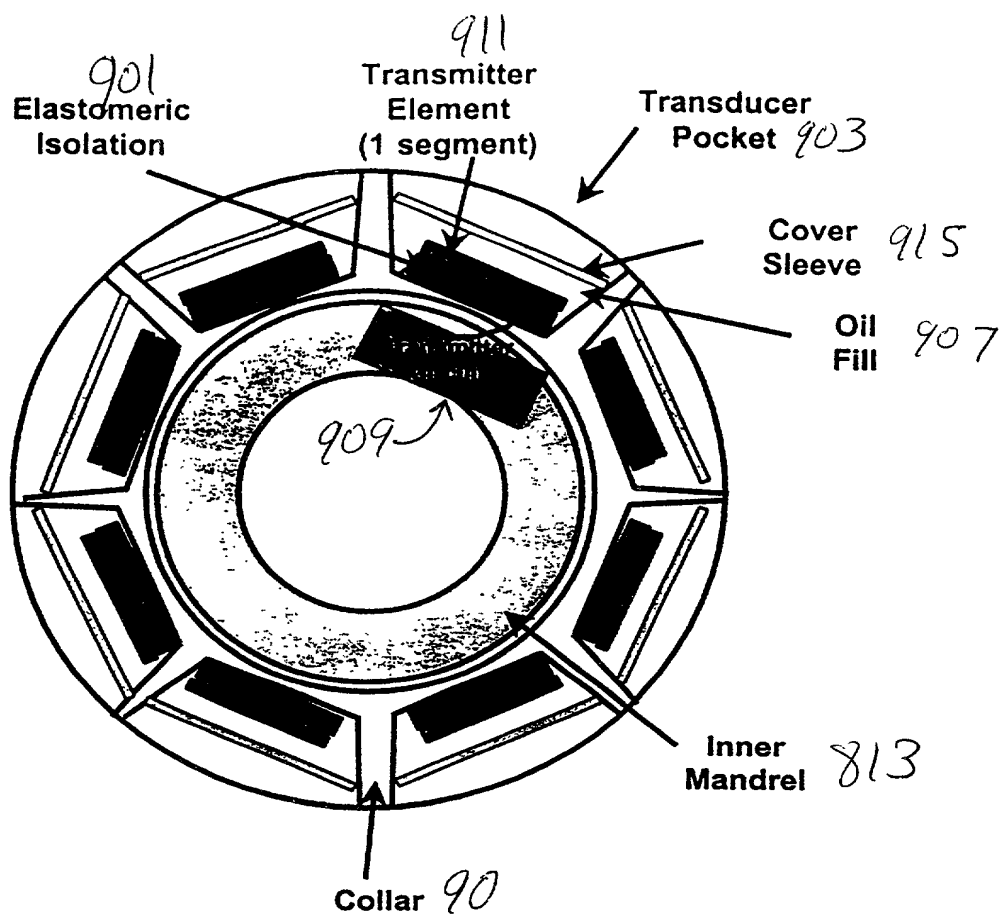


Figure 9 Individual Segmented Transmitter Example

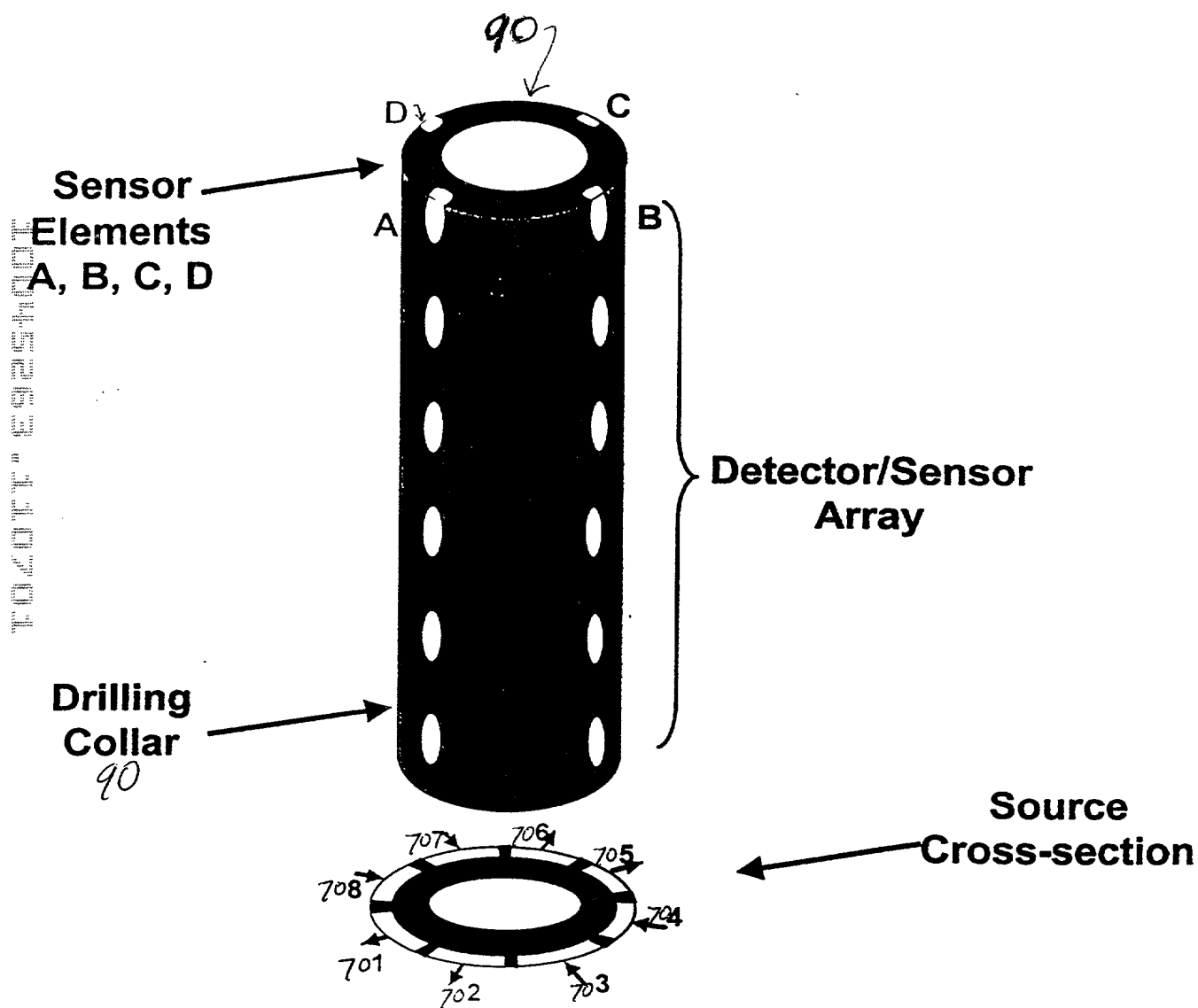


Figure 10 Sensor Array Layout

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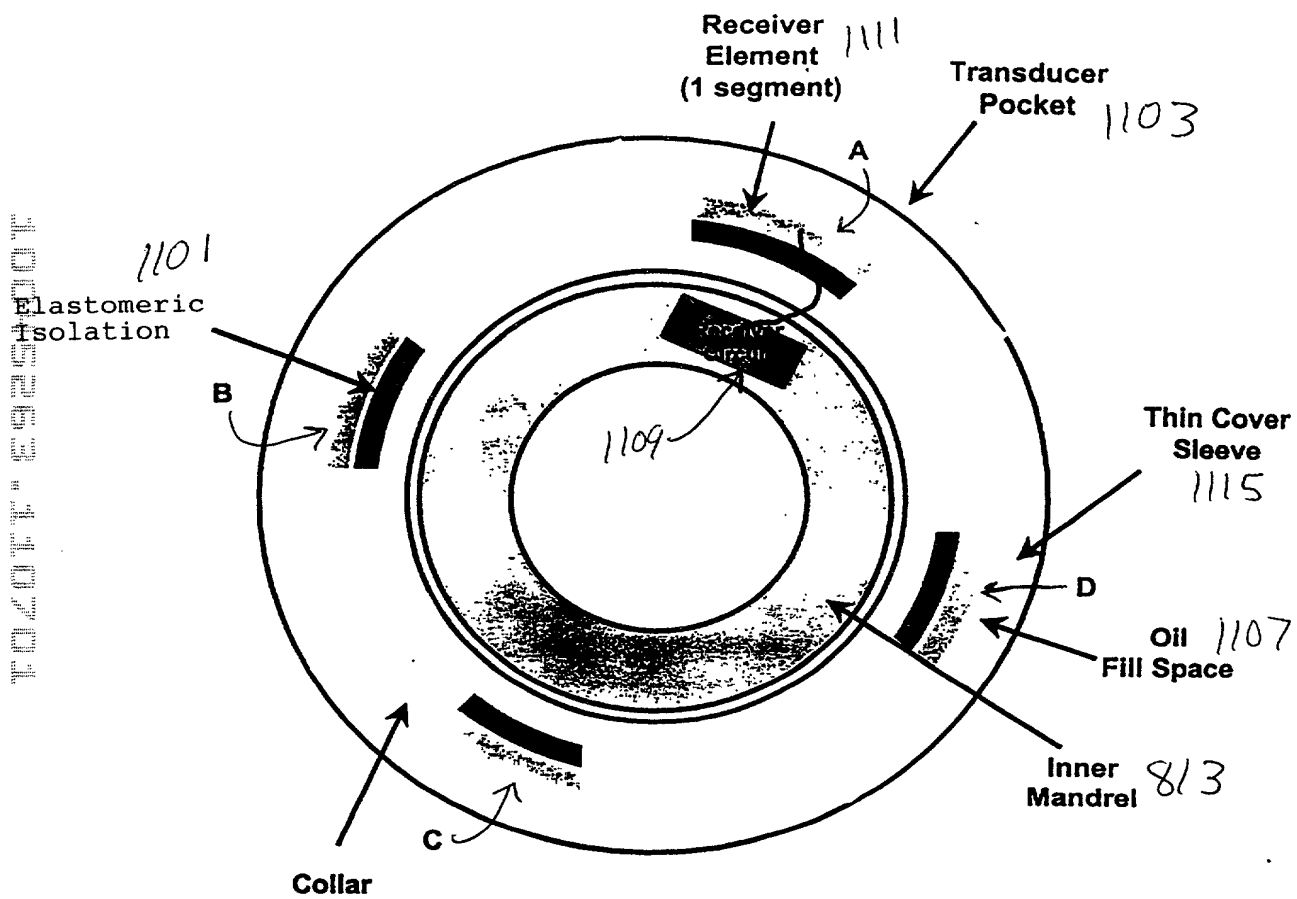


Figure 11 Segmented Ring Receiver Example

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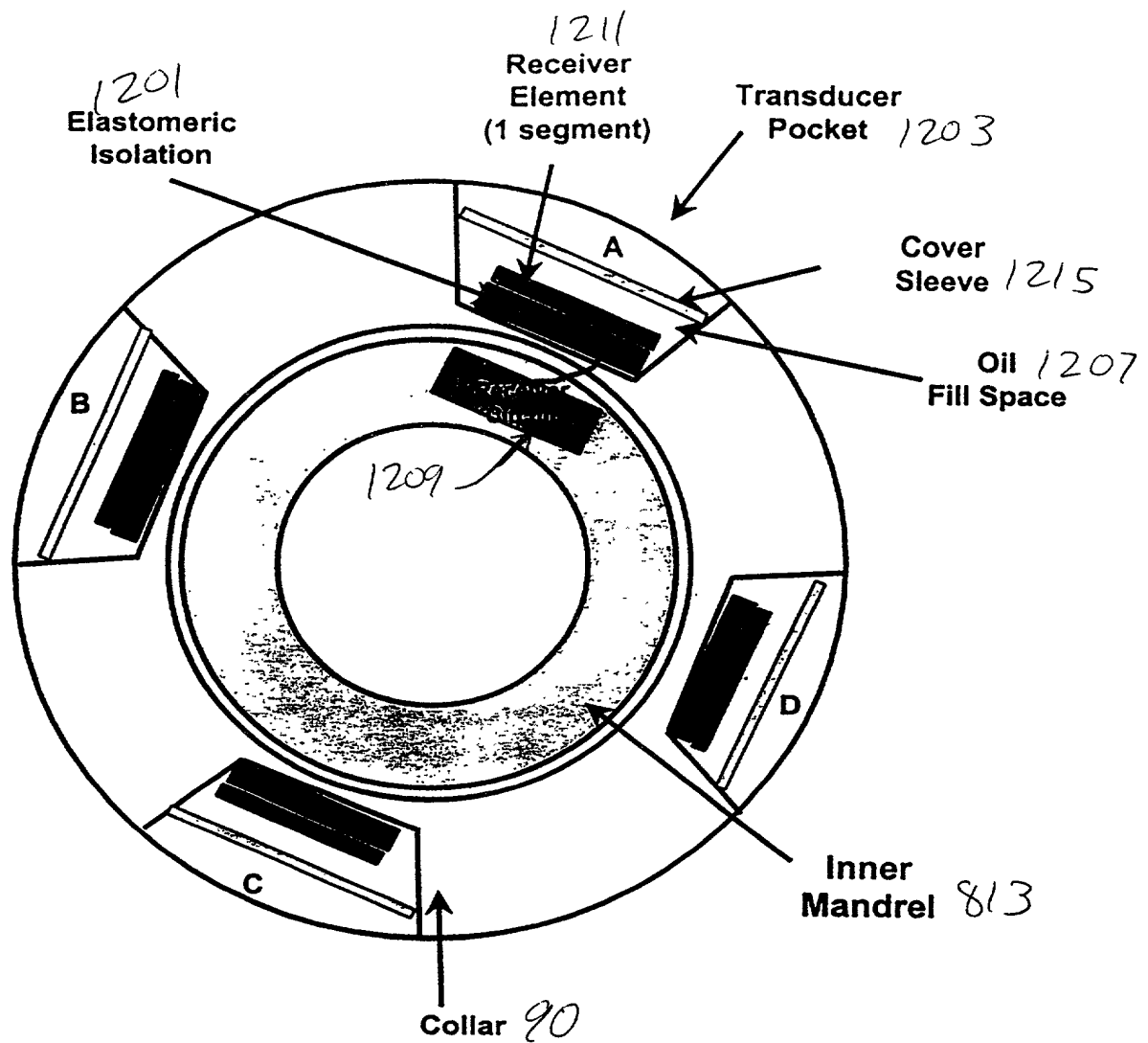


Figure 12 Individual Segmented Receiver Example

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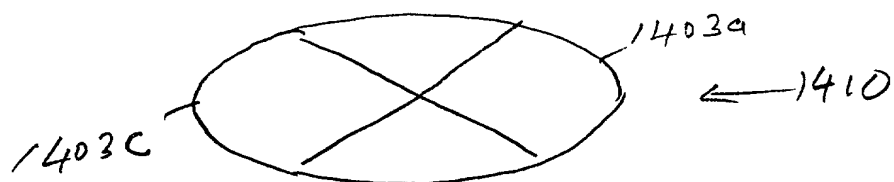
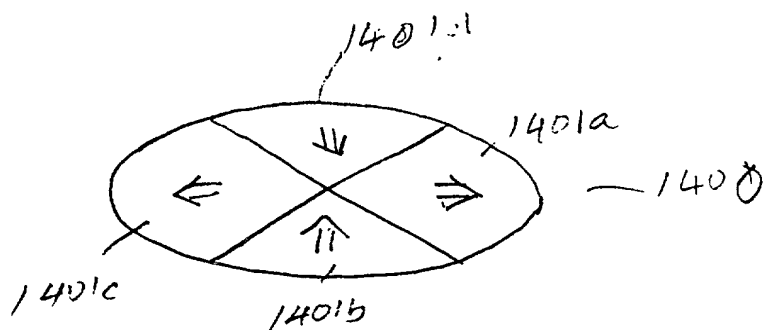


FIG. 13a

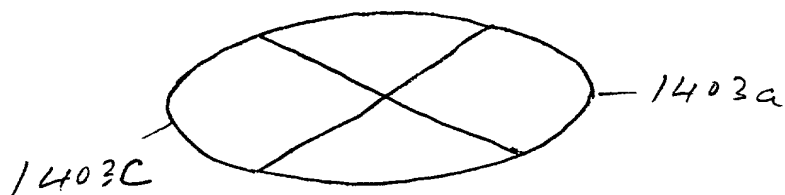
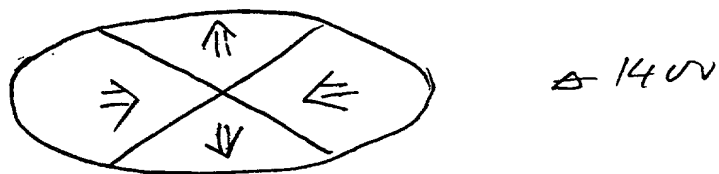


FIG. 13b

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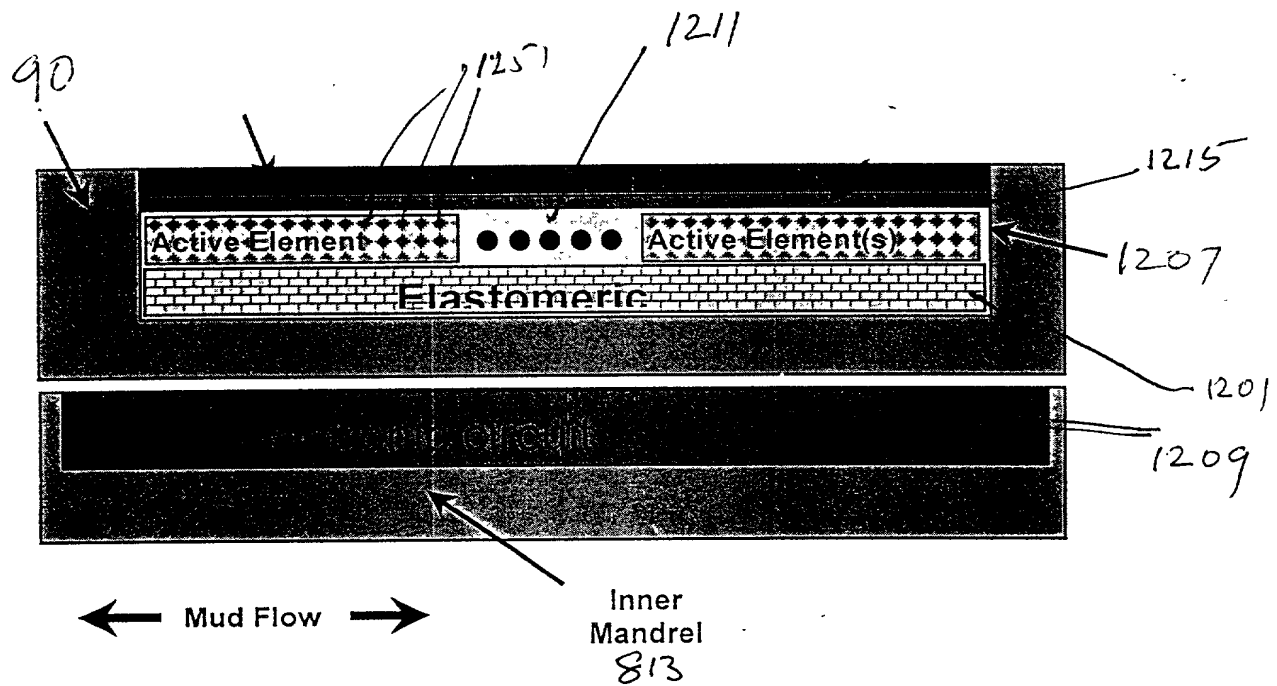


Fig. 14

Figure 15a

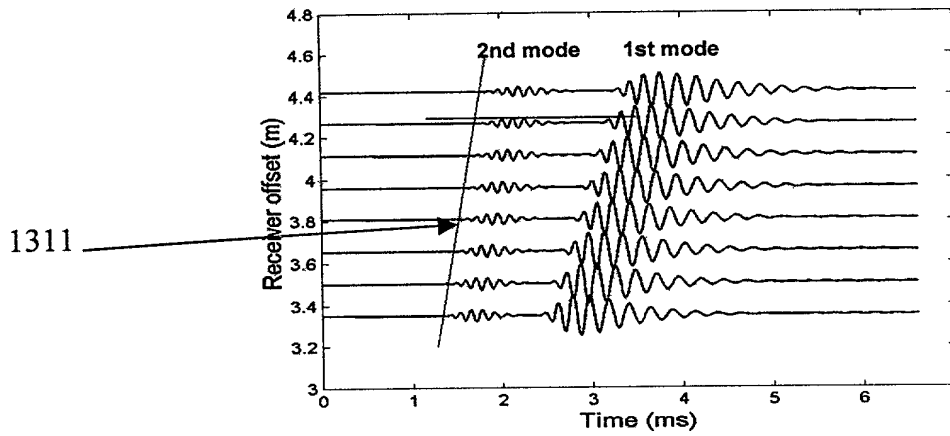
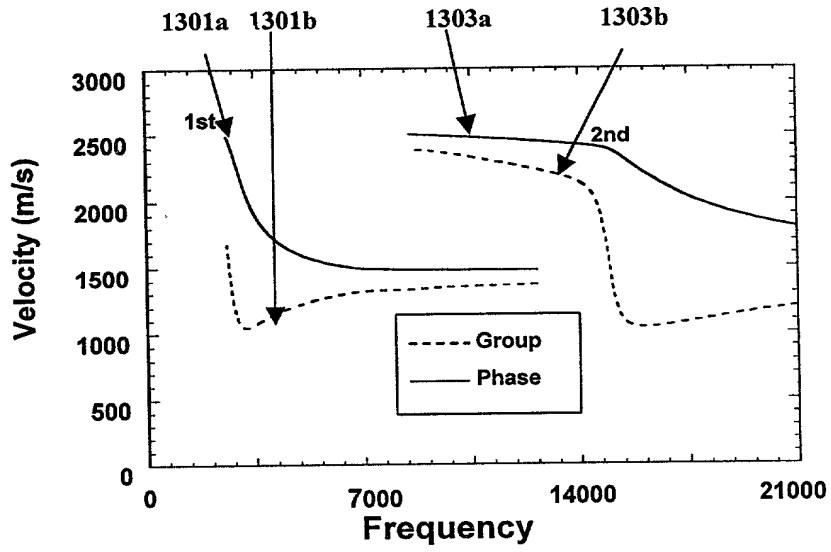
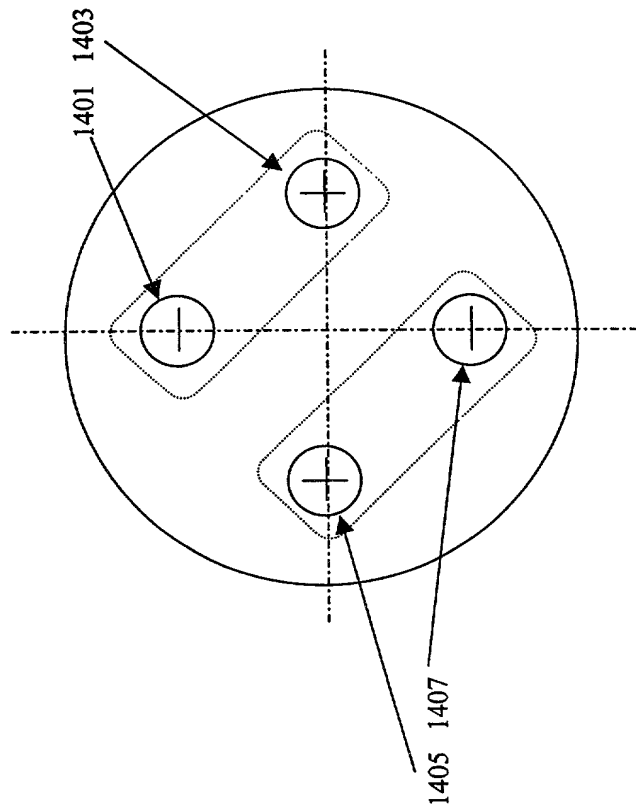


Figure 15b

Figure 16



A conceptual composition of a quadrupole source/receiver by two dipole sources/receivers.